



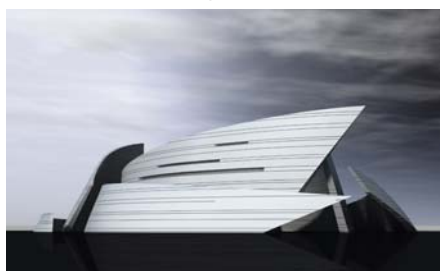
**STUDIO NICOLETTI ASSOCIATI**  
Manfredi Nicoletti and Luca F. Nicoletti

via di San Simone 75, 00186 Rome, Italy - tel. +390668805903 fax +39066892394  
email: studio.nicoletti@inwind.it - website www.manfredinicoletti.com

Arezzo Courthouse (2007) built



Astana State Auditorium (2004-2009) international competition, winner



Putrajaya Waterfront (2008-2010) international competition, winner



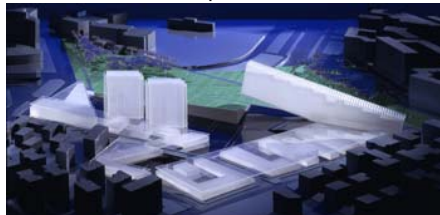
Athens Acropolis Museum (1998) international competition, winner



Cardiff bay Opera House (1994) int. competition, 1st phase winner



Navigatori Civic centre, Rome (2000) international competition, winner



Studio Nicoletti Associati, founded in 1957, delivers world-class professional design and management services. Studio Nicoletti Associati offers award winning architectural design, progressive infrastructure engineering, highly ranked project and construction management and are known for quality and professionalism. At over 30 professionals, we are one of the oldest and largest firms in Rome. We can deliver total services to a project or form flexible work teams that can integrate into a larger team in partnering and sub-consulting roles. The Studio practice's expanded through all major aspects of urban and building design in Italy, Europe, Africa, USA, Middle and Far East.

**Philosophy**

Manfredi Nicoletti is a pioneer in Megastructures and in Bioclimatic Urban and Architectural Design; Expert in Architectural Ecology for the Italian Government and the European Community, member of the Italian Institute of Bioclimatic Architecture (ENEA), of Eurosolar, and of PLEA (Passive and Low Energy Association).

Nicoletti received the International Award of WREN (World Renewable Energy Network). He is the founder of the course "Ecosystemic Architecture" at Rome University. His most innovative structures derive from the study of nature. Nicoletti has also published internationally various essays about architectural criticism and the urban ecosystem. His book "The Architecture of Caves", searching for the roots of architectural language, received the First International Prize by the CICA, Comité International des Critique d'Architecture.

**Leading architect**

Manfredi Nicoletti, Honorary fellow Of American Institute of Architects, graduated at Rome University "La Sapienza", Master in Architecture at the M.I.T, Massachusetts Institute of Technology - USA, PhD in Urban Design at Rome University "La Sapienza". After intense collaboration with Walter Gropius, Minorou Yamasaki and P.L. Nervi, Nicoletti opened his office in Rome.

Visiting Professor at the Rhode Island School of Design USA; Lecturer at the M.I.T. School of Architecture, Mass, USA.

Full Professor with tenure at Rome University "La Sapienza"; Vice President of the International Academy of Architecture; Member of the Russian Academy, of the Moscow International Academy and of the Academie de France d'Architecture.

**Main Projects**

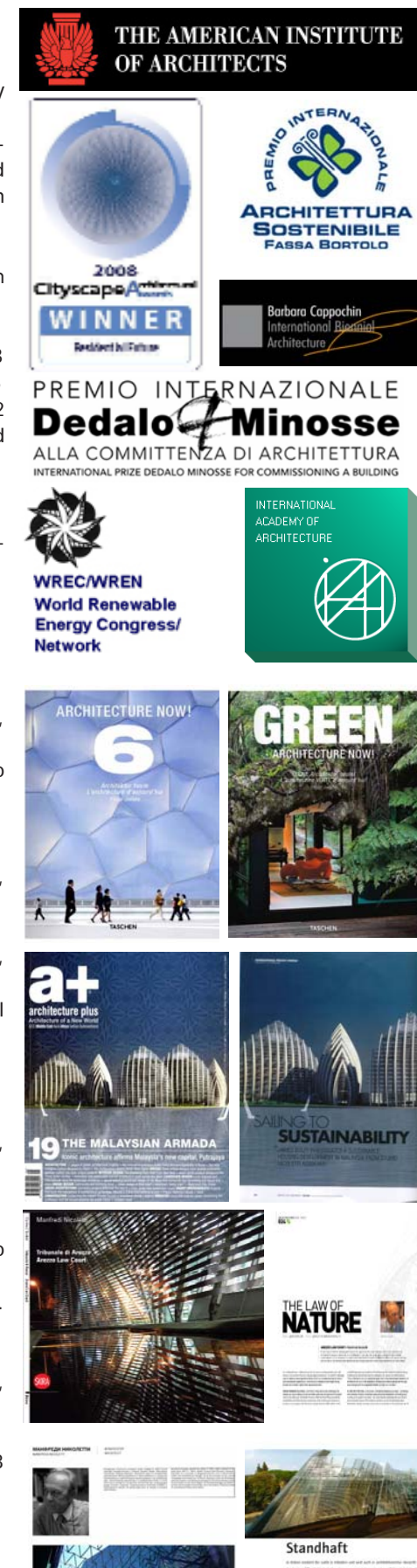
- The Putrajaya Waterfront development Kuala Lumpur Malaysia (2008-2010) 1st Prize International Competition, *under construction*
- The Main Auditorium for 3500 seats of Astana, New Capital of Kazakhstan (2003-2006), 1st Prize International Competition, *under construction*;
- The Millenium Park – Abuja, New Capital of Nigeria, inaugurated by HM Queen Elisabeth II;
- The Nigeria Cultural Centre and the Tower of Nigeria – Abuja, Nigeria (2003-2007), *under construction*;
- Hall of Justice, Lecce (2002-2004), European Competition, 1st Prize, *built*;
- The New Hall of Justice Arezzo (2002-2007), European Competition, 1st Prize, *built*;
- The New Hall of Justice Campobasso (2002-2006), European Competition, 1st Prize, *under development*;
- The New Hall of Justice Reggio Calabria (2000-2006), European Competition, 1st Prize, *under construction*;
- The G8 Conference Centre, Italian Chamber of Deputies' Annex, Palazzo Marini, Rome, *built*;
- The Scientific Greenhouse for Tropical Butterflies, Catania University, European Competition, 1st Prize, *built*;
- The Piazza dei Navigatori Civic Centre, Rome (2000), International Competition, 1st Prize;
- The New Acropolis Museum, Athens (1990-1999), International Competition, with Studio Passarelli, 1st Prize;
- The New Bibliotheca Alexandrina, Egypt (1989-1990), International Competition, 2nd Prize;
- Cardiff Opera bay House (1994-1995), International Competition, 1st Prize, First Stage;
- The Tronchetto Vehicular and Maritime Terminal, Venice (1963-1964), International Competition, 1st Prize;
- The Agrigento General Hospital (1986-2001), National Competition, 1st Prize, *built*;
- The Udine University City, Udine (1987-2001), National Competition, 1st Prize, *built*;
- The Passenger Terminals in the Catania, Pantelleria, Trapani Airports, National Competition, 1st Prize, *built*;
- The New Hall of Justice of Rome Piazzale Clodio (with G. Perugini), National Competition, 1st Prize, *built*;
- The Ville Satellite of the Monaco Principality, Fontvielle, Monaco Principality, *built*;
- Restructuring of the seafront of Reggio Calabria (1976-1988), National Competition, 1st Prize *built*

**Awards**

- Honorary fellowship of American Institute of Architects, 2009
- Cityscape Dubai international award 2008 residential category future to Putrajaya Waterfront, international competition winner
- Dedalo Minosse international award 2008, Fassa Bortolo sustainability international award 2008, Cappochin international award 2007, IAA international award 2002 to New Hall of justice in Arezzo, european competition winner
- Vaccarini Career Prize, Pedara Municipality 2007
- Title of "Officier de l'Ordre des Arts et des Lettres" received from the French Government in 2005
- Sabino d'Oro Career Prize from Rieti Municipality 2004
- Great Prize Viterbo San Valentino for architectural quality 2003
- Gold quadrangle Award to Catania Scientific Greenhouse, 2003
- Sport Palace, Palermo, Dedalo Minosse international award 2002
- Carabinieri headquarters, Rieti, Carrara international award 2002
- Gold Medal from the Architectural Association of Rome 2001
- Udine University City, Inarch annual national award 2001
- WREN World Renewable Energy Network U.K. V annual international award 1998

**Recent Major Publications (2008-2009)**

- P. Jodidio, *Green Architecture Now*, (Manfredi Nicoletti, Putrajaya Waterfront development), Taschen, Berlin 2009
- P. Jodidio, *Architecture Now! 6*, (Manfredi Nicoletti, Arezzo Courthouse), Taschen, Berlin 2008
- *New Arezzo Courthouse* in: Concept, vol. 118, Seoul 2009
- *The Malaysian Armada* in: Architecture plus n. 19, Dubai 2008
- *Nigeria Cultural Centre & Astana Concert Hall* in: Instant cities, Blackdog Publishing, London 2008
- *Shanghai Expo 2010 Italian Pavilion* in: Concept, Seoul 2008
- *Bioclimatic accents of Manfredi Nicoletti* in: Tall Buildings n.04, Moscow 2008
- *To the clear future in full sail, Putrajaya, Malaysia* in: Tall Buildings, n.03, Moscow 2008
- *Natureza reinventada / Nature reinvented. Manfredi Nicoletti* in: Attitude, n. 22, Lisbon 2008
- *Arezzo Law Court*, in: L'Arca, n. 232, Milan 2008
- *Studio Nicoletti Associati astounds with its civic gifts*, in: Hinge, n. 150, Hong Kong 2008
- *Waterfront Finger* in: Dialogue, May, Hong Kong 2008
- *The Law of Nature*, in: Modern Design n.13, Madrid 2008
- *An avant-garde justice hall*, in: Azure, March-April, Toronto 2008
- *Arezzo Law Court completed by Manfredi Nicoletti*, in: Space n. 3, Hong Kong 2008
- *The New Arezzo Law Court*, in: Kontakt n.2, Phoenix 2008
- *Leaf Wave, New Arezzo Law Court, Italy*, in: Dialogue n.123, Hong Kong 2008
- *New Arezzo Law Court, Italy*, in: Plan n.5, Dublin 2008
- *Sailing Sustainability*, in: Middle east architect n.6, Dubai 2008
- *Ready set sail* in: Space n.1, Kuala Lumpur 2008
- *Manfredi Nicoletti's Sail boats won Putrajaya project*, in: Blueprintasia, Selangor 2008





## Capability and Process

Projects are delivered from concept design through detailed proposal, final proposal, tender action, to practical completion with works supervision. Projects are located worldwide. Studio Nicoletti acts as team leader and coordinator of teams made of high qualified international experts and local consultants. Projects are always a work in progress process developed in accordance with client requirements.

List of major recent completed or under completion projects and their duration, size, costs, design teams:

The Nigeria National Complex, Abuja  
2006-2011 **(under construction)**  
Client: Federal Republic of Nigeria, Ministry of Culture and Tourism  
170.000 sqm  
Cost: € 300,000,000  
Structures: RFR, Paris + Stuttgart  
Plants: S.E.I.T.P. Tractebel, Bruxelles - Coyne et Bellier, France  
Acoustic: Xu Acoustique, Paris  
Scenographies : TPC, London  
Construction: Salini Nigeria Ltd.



Reggio Calabria Hall of Justice, Italy  
2004-2010 **(under construction)**  
*European competition, first prize - WREN International Award*  
Client: Ministry of Justice  
75.150 sqm  
Cost: € 70,000,000  
Structures: M. Mele  
Services: ENETEC - R. Tito  
Construction: Bentini spa



Astana State Auditorium, Kazakhstan  
2002-2010 **(under construction)**  
*International competition, first prize*  
Client: Astana State  
54.000 sqm  
Cost: € 120,000,000  
Structures: Ingegneri Associati, Rome  
Services : ENETEC, Rome  
Acoustics: Y. Xu - Associates, Paris;  
Scenography: Changement à Vue, Paris  
Q.S. and consultations: Astanagorproekt, A. A. Kenzhetayev



Arezzo Courthouse, Italy  
2001-2007 **(built)**  
*IAA International Award, Dedalo Minosse international award, Cappochin international award, Fassa Bortolo international award*  
Client: Ministry of Justice, Arezzo Municipality  
25.000 sqm  
cost: € 13,456,000  
Structures: M. Mele  
Services: E.N.E.T.E.C.  
Construction: Nembo sclr



Palermo Sport Palace, Italy  
1999-2001 **(built)**  
*Dedalo Minosse International Award*  
Client: Palermo Municipality  
23.500 sqm  
Cost: € 11,720,000  
Structures: A. Rizzo  
Coordination: L. Campagna  
Services: M. Bonafede, S. Guercio  
Q.S. and works supervision : E. Gentilucci



## Process

The goal of the design development phase is to complete and refine the design at all scales, and to generate expressive and appropriate details that will guide the process of deciding on the techniques and technologies to be employed for fabrication and construction.

The project will be designed and coordinated in 3D by all consultants in order to gain an outstanding level of quality in both the processes of design and development. From the first design phases 3D collaboration between architects and engineers will grant the production of efficient coordinated designs.

This work is based on new technologies such as generative CAD and computer controlled fabrication in order to rationalize and coordinate data flow through the multitude of stages of architectural project. This phase consists of the production of construction documents using CAD and BIM instruments. The final phase will be the fabrication of "mock-ups" and "construction samples". This will be done in order to get an accurate sense of how the building will be built and what its actual character will be at the 1:1 scale.

## Roles

Leading architect Manfredi Nicoletti, awarded in several international competitions, will be directly involved in the design as team leader and general coordinator. Associated architect Luca Nicoletti, as an expert in direction management of high complexity projects, will be delivering and monitoring the whole project to tender construction. Senior architects from Studio Nicoletti Associati will carry out the detailed design.

The whole team will be in Melbourne to present the entry if selected, principal and delegates will be regularly sent to Melbourne during the project development.

By now, our office's delegates, senior architects and junior architects, are working in Kuala Lumpur to develop our latest international competition winner project, Putrajaya Waterfront.

The Rome office currently works with international high qualified consultants, such as RFR engineering from Paris-Stuttgart, Xu acustique from Paris, Hoare Lea and Arup from London. Also, project development involves usually international well known companies such as Permasteelisa (facades), Rheinzik (cladding), Mariotti (marbles), Poltrona Frau (furnitures). Specific qualified consultants will be involved in the preliminary design process.

Studio Nicoletti aims to form a joint venture with a Melbourne based architecture office. We program to complete the schematic design in Rome and then send a team to Melbourne to work with a joint venture partner to oversee the detailed design and project delivery phases.

## Local sub consultants

Mordue Engineering will act as Structural & civil engineers sub consultants.

Mordue Engineering is a Melbourne based structural and civil engineering consultancy which has been invited to join the Studio Nicoletti Associati team for this project due to their experience on local landmark projects such as the Royal Children's Hospital, and their commitment to unique, innovative and highly architectural projects.

Mordue Engineering design and document using three dimensional software and have been involved recently in numerous projects where architectural structural and building services designs have been elaborated in three dimensions.

Environmentally sustainable design (ESD) local consultants who are accredited for Greenstar rating will be involved in the project from the very first stage.

Local Building surveyors will be involved to assess building compliance with the Building Codes of Australia.

## Client references

Salini costruttori S.p.A., Via della Dataria, 22 - 00187 Rome Tel. +39 06 67761 Fax : +39 06 6776288 E-mail : info@salini.it - www.salini.it  
Arezzo municipality, Piazza della Libertà 1, 52100 Arezzo - tel. +3905753770 fax +390575377613 informacomune@comune.arezzo.it  
Palermo Municipality, Palazzo delle Aquile, Piazza Pretoria, 1, tel. +39091-7402220-2494 - fax +39091-333267 assessoratosport@comune.palermo.it

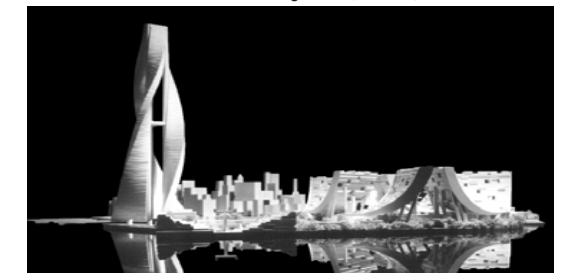
Campobasso Courthouse (2005)  
international competition, winner



Tall Ship Tower, Mestre (1992)



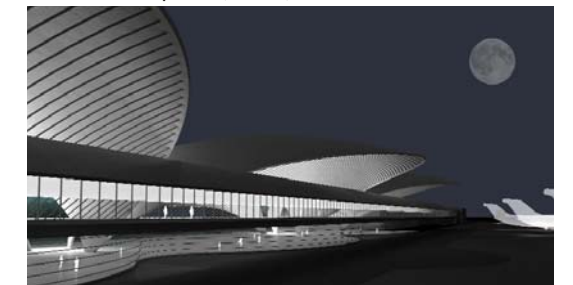
New York Crescent Project (1978)



Calabria tower (1997)  
international competition, 2nd prize



Lamezia Airport (2007)





**Iconic buildings**

Astana state Auditorium (2004-2009)  
under construction



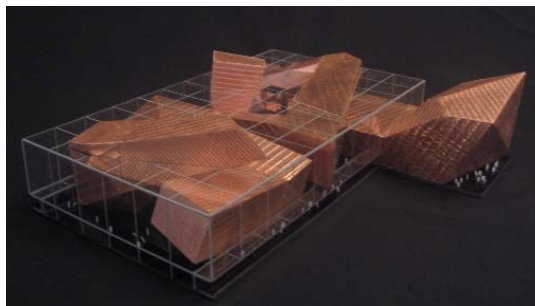
Putrajaya Waterfront (2008-2010)  
under construction



Shanghai expo italian pavilion (2009)  
international competition, honor mention



Warsaw Moma (2007)  
international competition, honor mention



Taipei CDC (2009)  
international competition, honor mention



**Methodology to carry out the assignment**

Our philosophy to conceive building design is the result of an "organic growth" from a "specific context". A context which is both the humus (the fertile soil) and the raw material of any architectural conception.

"Organic growth": its meaning derives from our observation of natural objects, biological or mineral. Natural objects are never banal, meaningless, without an original character of their own. They have a unique completeness. Our primordial concept of beauty, harmony and necessity derives from their analysis. The structure of a leaf, of a flower, a crystal or a tree does not have any futile complications, redundancies or superfluities. Its form and consistency is the outcoming of extremely rigorous and creative engineering: the most economic and harmonious effort to ensure growth, life and resistance against external forces. The only model of truly organic architecture.

Today it does not exist any more a physical "site" which could be really relevant for providing significant roots to a contemporary building. Today our intellectual multimedia concrete or virtual environment has a global dimension, overpowering the notion of a specific limited physical site or place.

By "specific context" we mean any physical or intellectual component converging upon the functional, social and symbolic values that an architectural building has to satisfy, blend with and express. In brief: a "specific context" is the physical and immaterial environment, visible or invisible, real or virtual, its background of history and traditions and, of course, the building functional program, its social meaning, the hopes of people for their future and any kind of physical or non-physical constrains or targets we can detect within the complex and pragmatic content of the "specific" context we are working in.

While our observation and understanding of the natural process concerning "organic growth" and form can guide us in trying to recreate (in a metaphoric way) a similar process for conceiving our architectural buildings, our comprehension of the "specific context" to which we must give an interpretation and a concrete shape is the basic raw material of our design process. Our definition of a specific context is the first basic step in architectural design, for the "invention" of architecture.

Though the elements converging in such a context are innumerable. We must make a choice, establish a hierarchy. This is the first creative act in the design process.

For us a constant guide to start to develop a creative concept of a "context" and consequently a design process is to detect what is most strongly felt to be missing in the "specific context" we are operating in. Our architecture must eliminate such a failure. "The man (said J.P. Sartre) is what he is missing the most. A poet is a poet because he is missing poetry in his life".

**Heritage related projects**

Scientific Greenhouse Catania University (1999-2002)  
built



Arezzo Courthouse (2001-2007)  
refurbishment and extension  
built



Palazzo Marini G8 Conference centre (2002)  
built



Lecce Courthouse (2002-2004)  
built



**Building Pedagogy**

Influences that affect an architectural project are both general for the project type and specific to the location or project context.

Studio Nicoletti's methodology is devoted to addressing, understanding, and mapping the global and local parameters, with the goal of better controlling the architectural production. This research addresses issues of interdisciplinary collaboration, environmental life cycle issues, and the rationalization of production.

Questions of design are therefore complemented by influential project parameters such as: social, political, and economic structures, legal and code issues, contextual landscape and environmental parameters, technological systems of construction and fabrication, and building maintenance and life cycle.

Every architectural project is by nature interdisciplinary since it involves people, the city, the landscape and the environment.

Studio Nicoletti will collaborate with the Faculty's, the University and the users to deliver an Iconic building, outstanding in appearance, function and performance, in order to provide an inspiring work environment for all users. User's participation in building design and management is a fundamental approach to deliver an outstanding level of quality in both the processes of design and development and in the finished product.

The project will be based on the best possible processes of design, collaboration, procurement and construction, with all parties working closely together and with staff and students who will monitor and record the processes.

The basis of the architectural project is the development of a functional brief and the evaluation of its overall feasibility within the project context. The first phase of the architectural project is to acknowledge a client brief, and to conduct analysis to determine the feasibility of a project. This phase has to outline the current physical, infrastructural, and legal conditions and restrictions of a site and develop a diagrammatic approach to assessing its compatibility with the program and the client brief.

The second step of the project is the Schematic Design which transforms the diagrammatic descriptions of the feasibility study into functional, logical, thematic, and aesthetic architecture. The contextual issues of site and connections are addressed, and solutions for basic issues of structure, materials, overall aesthetics, and volumetric relationships are explored. Here is formulated the project's identifiable architectural expression, its overall character, its Iconic image.

The unique design of this building will play an essential part in the Faculty's goal of attracting and retaining the best staff and allowing flexibility and choice in work styles.

The new building will interact with the existing Campus built and natural landscape, in accordance with the current Parkville Campus Masterplan which identifies the existing location of the Architecture and Old Commerce buildings as the site for the new building. These current buildings contain items of heritage significance (as XIX sec. Joseph Reed's façade elements), elements which will be addressed in the design response in accordance with University heritage management plans and policies and in consultation with relevant heritage committees and consultants. Natural elements will be considered and involved in the global design scheme which comprehends landscape and environment design.

**Landscape related projects and master-plans**

Sundsvall arts centre (2008)  
international competition



Cote d'Azur satellite city (2007-2009)  
international competition, honor mention



Abuja Millennium park (2004-2005)  
built



South Johor iconic park (2008)  
international competition, honor mention



Putrajaya Waterfront development (2008-2010)  
under construction





### The Academic environment

Teaching activity requires both single, traditional, quiet separated areas and common interactive innovative spaces.

The new building will complete the Campus with outstanding accommodation for research activities within the faculty.

There will be research work areas for academic staff, research staff, and research higher degree students. These spaces will consist of traditional individual offices, separated from the general teaching facilities, allowing a combination of quiet, solitary research work. There will be a functional connection with additional areas with open, interactive workspaces, with outstanding facilities for formal interaction between staff and students, informal and peer-to-peer learning, experimentation and discussion as well as collaborative group or team work. Informal Studio spaces will be creative, tolerant of mess, able to be decorated and personalised, and focused on making students feel valued. Exhibition spaces will be provided relating to these areas.

The building will host traditional teaching spaces for tutorials and seminars, for small class groups of 15-25 students, highly engaged with digital media and immersive projection. Special rooms for digital design teaching with related equipments will be located near to main classrooms. The complex will include as well two small lecture theaters, two medium theaters and one large theater with related breakout spaces. Special workshops rooms and laboratories with equipments for model production will be located at the building's ground level.

The building will provide workspace for operational and support staff, as well as an executive area for the offices of the Dean, Deputy Dean, and Faculty General Manager, and dedicated administrative staff and meeting rooms.

The library, with its leading collection in the region of architecture related texts, will provide spaces for individual and group study, with related technical equipments.

### Reference: Udine University Campus, Italy (1982-1997)

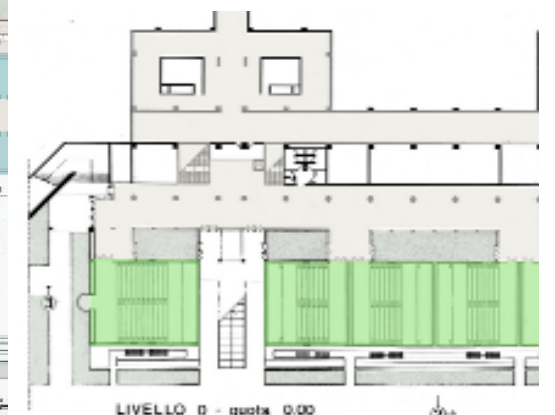
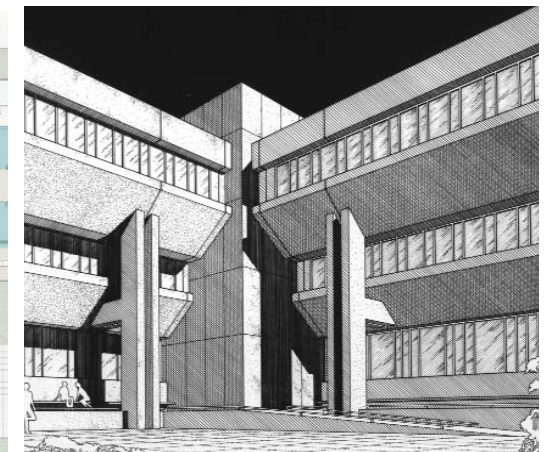
The University Campus of Udine, the hugest in Italy, is a flexible building system suitable for growth and adaptation. It is based on acretionable macro-modules where work and service spaces are carefully balanced. The campus includes laboratories, greenhouses and stables. Its fulcrum is a plaza where a vast portico opens onto a common services building which connects to a sport centre.

In the departmental organism, the most important of the complex, the macro-modules, forming a series of square courts, consist of two elements: segments and nodes. The nodes contain the services and vertical routes.

The working spaces in the segments are kept as simple as possible to facilitate flexibility. All teaching areas are on the ground floor. The upper floor houses research laboratories used by professors while the intermediate floor is a spontaneous meeting place for teachers and students, being devoted to libraries and administration.

The inverted pyramid section determines an exterior sequence of porticos and, internally, creates a volume where the three levels open up, allowing full visual participation in the University's academic life.

The cladding of the external walls consists of precast concrete three-dimensional panels, finished with a combination of white cement, marble aggregates and inorganic pigments.





**Design Studio**

The Design Studio will be the central core of the new building. It will be a new outstanding space designed in order to host a dynamic, collaborative and interdisciplinary community of students, academics and professionals.

Here will be the place for immersion in professional culture, built to demonstrate the best practices of engineering, fabrication, construction and servicing. This space is going to encourage staff-student interaction, experiential learning, teaching based on advanced theories, and global engagement in relevant social issues.

**Reference: New facilities, University Campus, Udine, Italy (2008)**

The New buildings designed for the University Campus of Udine will complete the whole structure with some missing functions such as main Library and department's laboratories. Both are extremely functionally flexible and based on a simple design: two parallel buildings are separated by an empty green space with connections at superior levels. This solution allows a construction by consecutive phases. The structural frame is minimized and modular, to obtain an entirely open internal space free to change according to new functional requirements.





**The Living Building - Sustainability and technologies**

Manfredi Nicoletti is a pioneer in Bioclimatic Urban and Architectural Design; Expert in Architectural Ecology for the Italian Government and the European Community, member of the Italian Institute of Bioclimatic Architecture (ENEA), of Eurosolar, of PLEA (Passive and Low Energy Association). Nicoletti received the International Award of WREN (World Renewable Energy Network). He is the founder of the course "Ecosystemic Architecture" at Rome University. His most innovative structures derive from the study of nature. Nicoletti has also published internationally various essays about architectural criticism and the urban ecosystem, as "Ecosistema Urbano", Dedalo, Bari 1985.

Studio Nicoletti's projects are always focused on sustainable design, and on sustainable use of materials, energy, air and water. The buildings take advantage of local climate conditions and have specifically designed systems of sun-shading and natural ventilation. They provide high levels of occupant comfort, high quality natural light, ventilation and acoustics. Internal spaces are adaptable and flexible.

The new Building will demonstrate an outstanding level of environmental performance, designed to achieve a 6-star Greenstar rating using Green Building Council of Australia rating system. Local environmentally sustainable design (ESD) consultants will be involved in the project team. The following factors are going to be considered, with consequent strategies

**Management:** adoption of sustainable development principles from project conception through design, construction, commissioning, tuning and operation.

**IEQ:** reduction of environmental impact along with occupant wellbeing and performance by addressing the HVAC system, lighting, occupant comfort and pollutants.

**Energy:** control of greenhouse emissions from building operation by addressing energy demand reduction, use efficiency, and generation from alternative sources.

**Transport:** reduction of demand for individual cars by both discouraging car commuting and encouraging use of alternative transportation.

**Water:** minimization of potable water through efficient design of building services, water reuse and substitution with other water sources (specifically rainwater).

**Materials:** minimization of non recyclable materials use and of resource consumption through material selection, reuse initiatives and efficient management practices.

**Land Use & Ecology:** reduction of project's impact on its immediate ecosystem, by discouraging degradation and encouraging restoration of flora and fauna.

**Emissions:** control of source pollution from buildings & building services to the atmosphere, watercourse, and local ecosystems.

**Innovation:** marketplace innovation that fosters the industry's transition to sustainable building.

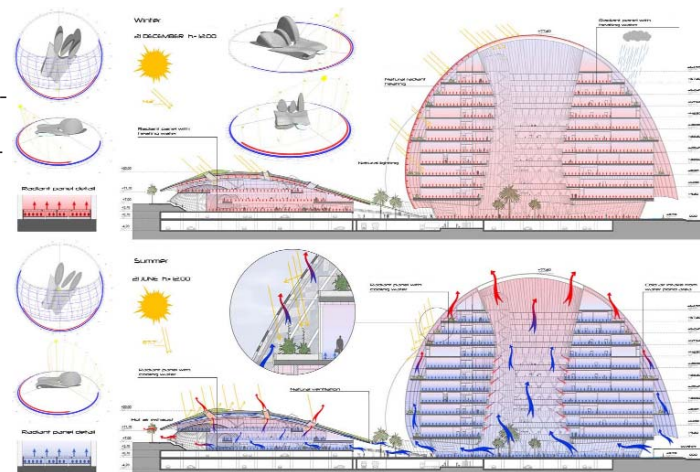
**Reference: Taipei Centers for Diseases Control Complex, Taiwan (2009, competition project, shortlisted)**

It's the first building of its kind designed to achieve a Gold rating from both LEED and Green Building certification systems.

The holistic design carried out so far aims at reducing resources consumption and operating costs, minimise environmental impacts and positively contribute to the local environmental quality.

The categories evaluated are the followings:

1. Biodiversity index (BD)
2. Green landscaping index (TCO2)
3. Site soil water content index (I)
4. Daily energy conservation index (EEV)
5. Carbon dioxide reduction index (CCO2)
6. Waste reduction index (PI)
7. Indoor environment index (IE)
8. Water reduction index (WI)
9. Sewage and garbage index (GI)



**Reference: Putrajaya Waterfront development, Kuala Lumpur, Malaysia (2008, competition winner)**

It will be the first sustainable residential complex to be built in Kuala Lumpur in 2010. The design of Waterfront Residential Development at Precinct 4, Putrajaya has aimed to create a truly sustainable development. Significant measures have been taken to reduce the impact of the development on the local and global environment. This will fundamentally be achieved by ensuring a sustainable design, construction and operation of the buildings. The approach to sustainability has been to ensure that the development makes efficient use of natural resources and has a greatly reduced environmental impact.

The main sustainability features in the scheme are the following:

The infographic grid lists the following sustainability features:

- Carbon Reduction Measures:**
  - External skin providing optimum shading to all residences
  - Community energy including CHP, surface water heat pump coupled with the lake and wind turbines
  - Low energy lighting
- Sustainable Water-use Measures:**
  - Efficient water appliances
  - Low water use white goods (dishwasher and washing machines)
  - Rainwater recycling
- Sustainable Materials Selection:**
  - All timber to be sourced from sustainable origin (MTCC/FSC Certified)
  - Low environmental impact materials selected
  - Locally sourced materials prioritised
- Sustainable Transport Measures:**
  - Cycle Storage
  - Secure cycle paths throughout the site
  - Car clubs with hybrid/electric vehicles
- Sustainable Waste Management:**
  - Waste sorting and recycling / re-use maximised during construction
  - Extensive recycling collection facilities will be provided in the development
- Sustainable Operation:**
  - Biodiversity (c.g. roof gardens)
  - Low energy and water consumption ensures reduced utilities costs
  - Home information packs will provide guidance on how to get the best out of the systems provided Monitoring



A primary objective of the sustainability strategy is to deliver a development that has low carbon emissions over its lifetime. The development aims to achieve a reduction in CO2 emissions of 50% below the average CO2 emissions of a residential building. This is to be achieved through the following steps:

**Step 1 - Passive design and energy efficiency measures**

The double skin approach allows to provide efficient shading from the sun while allowing natural ventilation of the flats as the outer skin is not sealed. The combination of balconies, vertical structural elements and horizontal brise-soleils provides shading to all flats, drastically reducing the need for cooling. Solar control glazing will also be considered. A large proportion of windows will be openable.

**Step 2 - Integration of Low or Zero-Carbon Energy Sources**

A community energy system will be provided. This is a sustainable choice as having only one single Energy Centre brings flexibility, now and in the future, in terms of energy sources and will allow an increased use of additional renewable energy sources. The following Low or Zero Carbon Technologies are proposed: Gas-fired or Biomass-fired Combined Heat and Power (400kWe); Surface water heat pump system (1MW); Micro wind turbines or Photovoltaics. These Low or Zero Carbon Energy Sources will generate approximately 40% of the energy requirements.